U. S. FOREST SERVICE

RESEARCH NOTE NC-98

NORTH CENTRAL FOREST EXPERIMENT STATION, FOREST SERVICE—U.S. DEPARTMENT OF AGRICULTURE

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Red Oak Lumber Makes Good Shade-Shelter for Hogs

ABSTRACT. — Describes the construction and testing of portable hog shade-shelters made from low-grade red oak lumber.
OXFORD: 833.4:176.1 *Quercus rubra*

Tests show that shade-shelters for hogs made from low-grade red oak lumber are both durable and practical. Usually, small portable farm structures are made from softwood lumber or metal; but we have found that many of them can be made from hardwood lumber if they are designed and treated for outdoor use. The cheaper grades of hardwood lumber are suitable and usually available at hardwood sawmills within the farm belt.

Our shade-shelter for hogs provides about 100 square feet of shade or about 64 square feet of shelter when the three hinged sides are down. We estimate it can be built commercially with about 400 board feet of lumber for about $100.

WHAT WE DID

To find out if shade-shelters for hogs could be built satisfactorily from low-grade hardwood lumber, we made six units out of parts cut from No. 2 Common red oak lumber and tested them at the Southern Illinois University Swine Farms. Each shade-shelter was placed in a pen with one boar ranging in weight from 200 to 800 pounds.

Sides of the shelters were kept down from September through April. During the rest of each year the sides were raised to provide shade (fig. 1). The hogs were rotated among pens and it was judged that all shelters received equal use.

WHAT WE LEARNED

We used slotted, built-in floors instead of removable floors with boards laid edge to edge for several reasons. The slots permit the floorboards to shrink and swell with changing moisture conditions without loosening the fasteners. Slotted floors improve drainage and ventilation in the shelters and keep the floors drier and cleaner than tight floors. When debris under the slotted floors accumulates to undesirable depths, the shelters can be towed to a new spot and the debris left behind. Because the slotted floor is a permanent part of the shelter, it braces the framing and prevents the corners from getting out of alignment. And finally, slotted floors require less lumber to build than solid floors.

Test shelters with board-and-batten siding performed better than shelters with tongue-and-groove siding. Gaps between the boards under the battens allowed the siding boards to swell and shrink freely (fig. 2). This type of siding also weathered better than surfaced tongue-and-groove siding. The weather side of the boards was not planed, and this rough

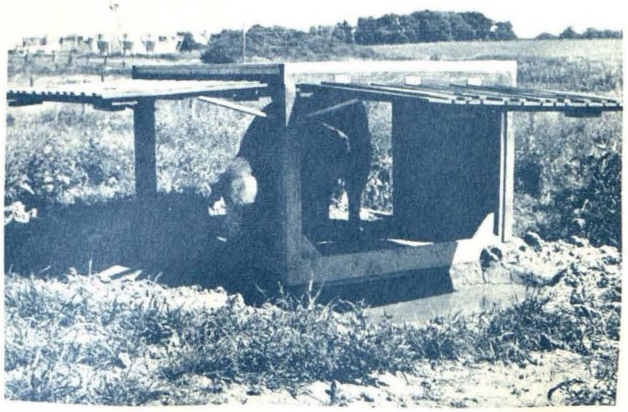

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Figure 1. — The combination shade-shelter in summer has the sides raised to provide over 100 square feet of shade.

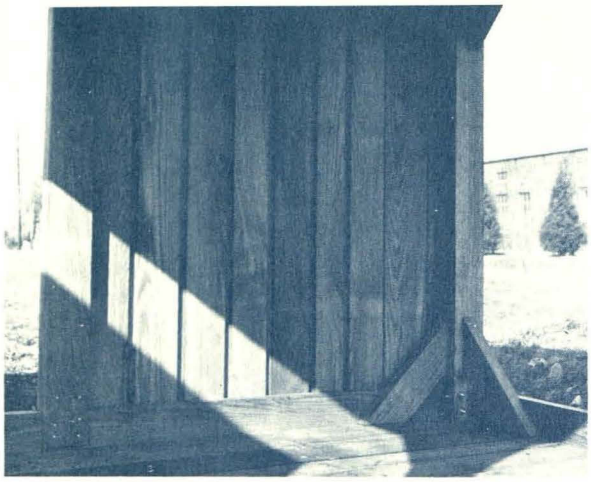

Figure 2. — Interior view of a shelter with board-and-batten siding. Boards are spaced ¾ inch for expansion and shrinkage.

surface held a stain finish better than planed surfaces on tongue-and-groove siding. Also, the board-and-batten siding required less labor to install and less lumber to make than tongue-and-groove siding because boards of random widths could be fully utilized. Tongue-and-groove siding had to be ripped to a few fixed widths before the edges could be matched on a high-speed molder. Both the ripping and the edge molding caused waste.

To avoid seasoning problems inherent with making posts from 4-inch-thick lumber, we made 3⅝-inch-square laminated posts with 2 by 4's. Because they have not checked or split, we believe they are superior to nonlaminated posts used in other tests. Costs of making laminated posts were partially offset by using 2-inch-thick lumber which is easier to obtain and dry than 4-inch-thick stock of the same quality.

By using thicker and wider framing than is usual for this type of structure, we prevented bowing of the side panels. The improved frame members were 15/16 inch thick and 5⅝ inches wide. A midpanel horizontal cleat in the side panels provided strong bracing and permitted us to end-butt short pieces for siding, thus increasing the utilization of our No. 2 Common grade lumber.

Treating farm structures with preservatives can be hazardous to hogs if not done properly. Freshly treated woods exude both salts of the preservative and the oil carrier. Eating these materials or even rubbing against them can cause ulcers, internal poisoning, or possibly death of the animals. However, if the exuded salts have been washed or brushed off and the carrier has evaporated from the wood, this danger is practically eliminated.

We treated the parts of our shade-shelters with a 5-percent solution of pentachlorophenol in mineral spirits. Skids were pressure treated and all other parts were cold-soaked. The pressure-treated flooring parts weathered outdoors for 8 weeks before being installed in the shelters. The other treated parts were left outdoors for several days until they were thoroughly dry. After 5 years of use there have been no toxic reactions of hogs using our treated test shelters and no wood decay has occurred.

Red oak framing, flooring, and siding have proved to be durable. The wood has withstood rubbing, scratching, and bumping by the hogs with little wear or breakage. Also, the hogs have not damaged the wood parts by chewing as they often do in wood structures.

COSTS

The yields of usable parts obtained from No. 2 Common oak lumber kept our material costs low. The 8/4-inch lumber yielded 67 percent, and the ¾-inch lumber 79 percent usable parts. Lumber costs were $35.56 and roofing, stain, hardware, and preservative costs were $16.61, making the total material cost $52.17 for each shade-shelter.

Labor time per shelter for a 2-man crew was 8.1 man-hours. Labor and material costs together were $72.42 per shelter.

Six shelters are an inadequate basis for predicting the cost of building shade-shelters under production conditions. However, we estimate that the labor, shop operation, and processing equipment depreciation costs per shade-shelter would be about $30. On this basis durable shade-shelters for hogs probably can be built commercially from No. 2 Common red oak lumber at a total cost of about $100 per unit, and sold at competitive prices.

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